Remarks

Claims 1-7, 10, 12-35, and 38-42 remain in the application. Claims 7, 10, 12, 14-16, 19-32, 34, and 38-41 have been withdrawn from consideration. Claims 8-9, 11 and 36-37 are cancelled.

By this amendment, claims 1 and 33 have been amended to more particularly set-out the subject matter of the present invention. FIGS. 3 and 4 support the changes to these claims.

Claims 1, 2-6, 8, 9, 11, 13, 17-18, 33, 35-37 and 42 were rejected under 35 U.S.C. §103(a) over Sakamoto et al., USP 6,524,511 (hereinafter "Sakamoto") in view of Hasebe et al., USP 6,713,849 (hereinafter "Hasebe"). Claims 8-9, 11 and 36-37 have been cancelled by this amendment. This rejection is respectfully traversed in view of the amendments made herein and the remarks provided hereinafter.

Claim 1 calls for an electronic device package comprising a support substrate including a flag, wherein the flag has a bonding surface. A first electronic chip having a first peripheral edge is attached to a first portion of the bonding surface with a first die attach material. A first continuous trench is formed in the flag in proximity to the first peripheral edge and extends only partially into the flag, wherein the first continuous trench includes a continuously rounded cross-sectional shape, a curved sidewall surface, and an inner edge at the bonding surface extending at least to the first peripheral edge, and wherein the first continuous trench surrounds the first electronic chip, and wherein the first die attach layer terminates at approximately the inner edge. An encapsulant covering the first electronic chip and at least a portion of the

curved sidewall surface.

Applicants respectfully assert that the combination of Sakamoto and Hasebe fails to make claim 1 obvious because neither reference either singularly or in combination shows or suggests a first continuous trench formed in the flag, extending only partially into the flag, and having a continuously rounded cross-sectional shape, a curved sidewall surface, an inner edge at the bonding surface extending at least to the first peripheral edge, and a first die attach layer terminating at approximately the inner edge.

In Sakamoto, the edges of the components are placed away from the surface edges of trenches 61, and Sakamoto's trenches extend all the way through the copper foil substrate 10 in the finished device as shown in FIGS. 9A-9C. Additionally, Sakamoto's solder attach layers do not terminate at approximately the inner edges of the trenches, they terminate before the edges. As stated in applicants' specification at paragraphs [0028]-[0031], applicants found that the continuously curved shape of their trench provides several unforeseen advantages including a surface tension effect that allows the electronic chips to be placed closer to the trenches and also reduces flow of die attach material into the trenches, which among other things saves on space and manufacturing costs, reduces waste, and improves reliablity.

Moreover, in Hasebe, the peripheral edges of his chip 3 are placed away from the surface edges of trenches 20, and the shapes of Hasebe's trenches would not provide the benefits resulting from the shape of applicants' trenches as described in paragraphs [0028]-[0031] of their specification. Additionally, applicants respectfully point out to that in FIG. 18 of Hasebe, his die attach layer does not terminate at the edge of trench 20, but

instead extends well into the trench 20. As described in applicants' specification at paragraph [0004], such an approach can lead to package delamination and other reliability problems that applicants' invention avoids. In view of the above, applicants respectfully submit that claim 1 is allowable over Sakamoto and Hasebe.

Claim 2 depends from claim 1 and further calls for the first continuous trench to have width greater than about 50 microns. Claim 2 is believed allowable for the same reasons as claim 1. Additionally, applicants submit that claim 2 is allowable because neither Sakamoto nor Hasebe show or suggest a width greater than about 50 microns. Applicants further submit that their invention distinguishes from the Gardner case referenced by the Examiner because applicants' claimed dimensions provide a structure that performs differently than the prior art devices. For example, applicants found that this width dimension provides the advantages set forth in paragraphs [0028]-[0031]. Both the Sakamoto and Hasebe references are silent in this regard.

Claim 3 depends from claim 1 and further calls for the first continuous trench to have a width between about 102 microns and about 330 microns. Claim 3 is believed allowable for the same reasons as claim 1. Additionally, applicants submit that claim 3 is allowable because neither Sakamoto nor Hasebe show or suggest a width in the range set forth in claim 3. Applicants further submit that their invention distinguishes from the Gardner case referenced by the Examiner because applicants' claimed dimensions provide a structure that performs differently than the prior art devices. For example, applicants found that this width dimension provides the advantages set forth in paragraphs [0028]-[0031]. Both the Sakamoto and Hasebe references are silent in this regard.

Claims 4-5 depend from claim 1 and are believed allowable for at least the same reasons as claim 1.

Claim 6 depends from claim 1 and further calls for the first continuous trench to have a depth in a range from about 100 microns to about 330 microns. Claims 6 is believed allowable for the same reasons as claim 1. Additionally, applicants submit that claim 6 is allowable because neither Sakamoto nor Hasebe show or suggest a depth in the range set forth in claim 6. Applicants further submit that their invention distinguishes from the Gardner case referenced by the Examiner because applicants' claimed dimensions provide a structure that performs differently than the prior art devices. For example, applicants found that this width dimension provides the advantages set forth in paragraphs [0028]-[0031]. Both the Sakamoto and Hasebe references are silent in this regard.

Claims 13 and 17-18 depend from claim 1 and are believed allowable for at least the same reasons as claim 1.

Claim 33 calls for a leadless electronic structure comprising a leadframe including a bonding site and a flag having a bonding surface. A first semiconductor device having a first peripheral edge is coupled to the bonding surface with a first chip attach layer, wherein the first semiconductor device includes a bond pad. A first groove is formed in the bonding surface surrounding the first semiconductor device and extending only partially into the flag, wherein the first groove comprises a substantially continuously curved inner surface and a first inner edge at the bonding surface extending at least to the first peripheral edge, and wherein at least a portion of first chip attach layer extends across the bonding surface and terminates at approximately the first inner edge. A bonding device couples the bond pad to the bonding site, and an encapsulating layer covers

portions of the flag, the bonding site, and the bonding device, the first semiconductor device, and at least a portion of the substantially continuously curved inner surface.

Applicants respectfully assert that the combination of Sakamoto and Hasebe fails to make claim 33 obvious because neither reference either singularly or in combination shows or suggests a first groove formed in the bonding surface surrounding the first semiconductor device and extending only partially into the flag, wherein the first groove comprises a substantially continuously curved inner surface and a first inner edge at the bonding surface extending at least to the first peripheral edge, and wherein at least a portion of first chip attach layer extends across the bonding surface and terminates at approximately the first inner edge.

In Sakamoto, the edges of the components are placed away from the surface edges of trenches 61, and Sakamoto's trenches extend all the through the copper foil substrate 10 in the finished device as shown in FIGS. 9A-9C. Additionally, Sakamoto's solder attach layers do not terminate at approximately the inner edges of the trenches, they terminate before the edges. As stated in applicants' specification at paragraphs [0028]-[0031], applicants found that the continuously curved shape of their trench provides several unforeseen advantages including a surface tension effect that allows the electronic chips to be placed closer to the trenches and also reduces flow of die attach material into the trenches, which among other things saves on space and manufacturing costs, reduces waste, and improves reliability.

Moreover, in Hasebe, the peripheral edges of his chip 3 are placed away from the surface edges trenches 20, and the shapes of Hasebe's trenches do not provide the benefits resulting from the

shape of applicants' trenches as described in paragraphs [0028]-[0031] of their specification. Additionally, applicants respectfully point out that in FIG. 18 of Hasebe, his die attach layer does not terminate at the edge of trench 20, but instead extends well into the trench 20. As described in applicants' specification at paragraph [0004], such an approach can lead to package delamination and other reliability problems that applicants' invention avoids. In view of the above, applicants respectfully submit that claim 33 is allowable over Sakamoto and Hasebe.

Claims 35 and 42 depend from claim 33 and are believed allowable for at least the same reasons as claim 33.

In view of all the above, it is believed that the claims are allowable, and the case is in condition for allowance, which action is earnestly solicited.

Respectfully submitted,

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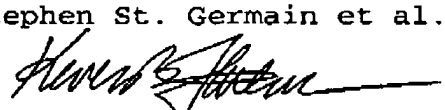

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